

Tutorial 3

Exercise 1

Given the following Python code:

```
def computeSum(item, n):
    i = None
    j = None
    sum = None
    i = 0
    while i < n:
        sum = item[0]
        j = 1
        while j <= i:
            sum += item[j]
            j += 1
        print("Sum for array ", i, " is ", sum)
        i += 1

e = [5, 4, 3, 11, 9]
s = computeSum(e, len(e))
print(s)
```

- (a) What is the function of the method computeSum()?
- (b) Compute the time complexity in big-O notation of the step counts for the statement:

sum += item[j];

in terms of the variable n in the method computeSum().

- (c) Show the output of executing the above Python code.

Exercise 2

(a) What is the time complexity of following code:

```

a = 0
i = 0
while i < N:
    j = N
    while j > i:
        a = a + i + j
        j -= 1
    i += 1

```

(b) What is the time complexity of following code:

```

a = 0, i = N;
while (i > 0) {
    a += i;
    i /= 2;
}

```

(c) What is the time complexity of following code:

```

for i in range(int(n/2), n):
    while j <= n:
        k = k + n / 2
        j = j * 2

```

$j = 1$
 $n = 8$

$j = 2, j = 4, j = 8$

$3 = \log_2 8$

$j < n$

Exercise 3

Obtaining the big-O notation in the following expression

(a) $\sqrt[3]{18}a^3b + a^4b\lg(a) + \frac{\sqrt{a}}{11}ab\lg(a) + \lg(109)$

(b) $31n^{2.5} + \sqrt{19} + 7n^2 \log(n)$

Reference:

<https://www.programcreek.com/2014/07/implement-a-queue-using-an-array-in-java/>
<http://www.java2novice.com/data-structures-in-java/queue/array-implementation/>